

CLAIMS

What is claimed is:

1. In a polymeric surgical clip comprising first and second leg members joined at their proximal ends by a resilient hinge, each leg member having a vessel  
5 clamping inner surface and an opposite outer surface, the vessel clamping inner surface being in opposition to the vessel clamping inner surface of the other leg member, the first leg member terminating at its distal end in a deflectable hook member curved toward the second leg member, the second leg member terminating at its distal end in a locking portion complementary  
10 to the hook member whereby when the first and second leg members are moved from an open position to a closed position about the hinge, the hook member deflects about the distal end of the second leg member to lock the clip in a closed position, the hook member having a continuously curved outer surface extending distally from the outer surface of the first leg  
15 member, side surfaces and an inner surface; the improvement comprising:  
complementary parts of an interlock mechanism  
formed along a portion of the vessel clamping  
inner surface of each of the first and second leg  
members, the complementary parts cooperating  
20 when the clip is in the closed position to capture  
a vessel and impede longitudinal movement of  
the clip in relation to the vessel.
2. The surgical clip according to claim 1, wherein the interlock mechanism includes a ridge portion formed along a portion of the vessel clamping

inner surface of one of the first and second leg members and a groove portion formed along a portion of the vessel clamping inner surface of the other of the first and second leg members.

5 3. The surgical clip according to claim 2, wherein when the clip is in the closed position, the ridge and groove are aligned.

4. The surgical clip according to claim 1, wherein the interlock mechanism includes a ridge portion formed along a portion of the vessel clamping inner surface of each of the first and second leg members and a groove portion formed along a portion of each of the vessel clamping inner surface of the first and second leg members, the groove portion on the first leg member being positioned opposite to the ridge portion of the second leg member and the groove portion on the second leg member being positioned opposite to the ridge portion of the first leg member.

15 5. The surgical clip according to claim 1, wherein the inner surface of the first leg member has a concave radius of curvature between the hinge and the hook member and the outer surface of the first leg member has a convex radius of curvature, the inner surface of the second leg member has a convex radius of curvature between the hinge and its distal end and the outer surface of the second leg member has a concave radius of curvature between the hinge and its distal end.

20 6. The surgical clip according to claim 1, wherein the clip comprises bosses coupled to the first and second leg members for engagement with a suitable clip applicator for applying the clips, the bosses joined in pairs to opposite sides of the first leg member between the hinge and

the hook portion, and to opposite sides of the second leg member at the distal end of the second leg member, the second leg member having sharp pointed members extending from the bosses.

7. The surgical clip according to claim 6, wherein a portion of the pair of  
5 bosses joined to the first leg member extend beyond the outer surface of the first leg member to form substantially parallel and spaced apart surfaces which prevent lateral movement of the first and second leg members relative to one another when the clip is in the closed position.
8. In a polymeric surgical clip comprising first and second leg members  
10 joined at their proximal ends by a resilient hinge, each leg member having a vessel clamping inner surface and an opposite outer surface, the vessel clamping inner surface being in opposition to the vessel clamping inner surface of the other leg member, the first leg member terminating at its distal end in a deflectable hook member curved toward  
15 the second leg member, the second leg member terminating at its distal end in a locking portion complementary to the hook member whereby when the first and second leg members are moved from an open position to a closed position about the hinge, the hook member deflects about the distal end of the second leg member to lock the clip in a  
20 closed position, the hook member having a continuously curved outer surface extending distally from the outer surface of the first leg member, side surfaces and an inner surface; the improvement comprising:  
a ridge portion formed along a portion of the  
vessel clamping inner surface of one of the first

and second leg members and a groove portion formed along a portion of the vessel clamping inner surface of the other of the first and second leg members, the ridge and groove portions being aligned in opposition to each other and cooperating when the clip is in the closed position to capture a vessel and impede longitudinal movement of the clip in relation to the vessel.

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10 9. The surgical clip according to claim 8, wherein the inner surface of the first leg member has a concave radius of curvature between the hinge and the hook member and the outer surface of the first leg member has a convex radius of curvature, the inner surface of the second leg member has a convex radius of curvature between the hinge and its distal end and the outer surface of the second leg member has a concave radius of curvature between the hinge and its distal end.

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10. The surgical clip according to claim 8, wherein the clip comprises bosses coupled to the first and second leg members for engagement with a suitable clip applier for applying the clips, the bosses joined in pairs to opposite sides of the first leg member between the hinge and the hook portion, and to opposite sides of the second leg member at the distal end of the second leg member, the second leg member having sharp pointed members extending from the bosses.

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11. A surgical clip comprising:

- (a) a first leg and a second leg, each of the legs having an inner vessel-clamping surface and an outer surface, the inner surfaces being positioned in opposition to each other;
  - 5 (b) a flexible hinge section integrally disposed between and joining the proximal ends of the first and second legs;
  - (c) a clip-locking mechanism formed by a deflectable hook member formed at the distal end of the first leg member and a complementary locking portion formed at the distal end of the  
10 second leg member whereby when the first and second leg members are moved from an open position to a closed position about the hinge, the hook member deflects about the distal end of the second leg member to lock the clip in a closed position;
  - (d) a protruding ridge formed along a portion of the inner surface of  
15 at least one of the first and second legs; and
  - (e) a groove formed along a portion of at least one of the first and second legs, the groove on one leg being in opposition to the protruding ridge on the other leg such that the ridge fits within the groove when the clip is in the closed position.
- 20 12. The surgical clip of claim 11, wherein the protruding ridge is formed along the inner surface of one leg and the groove is formed along the inner surface of the other leg.

13. The surgical clip of claim 11, wherein the protruding ridge and groove are formed along the inner surfaces of each of the first and second legs, the ridge and groove on each leg being in parallel.
14. The surgical clip of claim 11, wherein each ridge and groove extends  
5 along the inner surface of at least one of the first and second legs from a point near the proximal end of the leg to a point near the distal end of the leg.
15. A surgical clip comprising:
  - (a) a first leg and a second leg, each of the legs having an inner  
10 vessel-clamping surface and an outer surface, the inner surfaces being positioned in opposition to each other;
  - (b) a flexible hinge section integrally disposed between and joining the proximal ends of the first and second legs;
  - (c) a clip-locking mechanism formed by a deflectable hook member  
15 formed at the distal end of the first leg member and a complementary locking portion formed at the distal end of the second leg member whereby when the first and second leg members are moved from an open position to a closed position about the hinge, the hook member deflects about the distal end  
20 of the second leg member to lock the clip in a closed position;
  - (d) a protruding ridge formed along a portion of the inner surface of one of the first and second legs; and
  - (e) a groove formed along a portion of the other one of the first and second legs, the groove on one leg being in opposition to the

protruding ridge on the other leg such that the ridge fits within the groove when the clip is in the closed position.

16. The surgical clip of claim 15, wherein the ridge and groove extend along the inner surface of their respective one of the first and second legs from a point near the proximal end of the leg to a point near the distal end of the leg.
17. The surgical clip according to claim 15, wherein the inner surface of the first leg member has a concave radius of curvature between the hinge and the hook member and the outer surface of the first leg member has a convex radius of curvature, the inner surface of the second leg member has a convex radius of curvature between the hinge and its distal end and the outer surface of the second leg member has a concave radius of curvature between the hinge and its distal end.
18. The surgical clip according to claim 15, wherein the clip comprises bosses coupled to the first and second leg members for engagement with a suitable clip applier for applying the clips, the bosses joined in pairs to opposite sides of the first leg member between the hinge and the hook portion, and to opposite sides of the second leg member at the distal end of the second leg member, the second leg member having sharp pointed members extending from the bosses.